METHOD AND ARRANGEMENT FOR INDICATING CORRECT INSTALLATION OF PLUG-IN UNIT OF TELECOMMUNICATIONS DEVICE

FIELD OF INVENTION

[0001] The invention relates to a method and arrangement for indicating correct installation of a plug-in unit of a telecommunications device. The invention also relates to a plug-in unit for a telecommunications device.

BACKGROUND OF INVENTION

[0002] Many telecommunications devices such as routers, bridges and switches are comprised of a frame of a telecommunication device and plug-in units installed in plug-in unit slots in said frame. Electric connectors in a plug-in unit make galvanic contacts with corresponding electric connectors in the frame when the plug-in unit is inserted in the plug-in unit slot in said frame. The frame may have wirings such that plug-in units installed in said frame form a full mesh network or such that plug-in units installed in said frame are connected to a central element of the telecommunications device which may comprise one or more plug-in units installed in said frame or which may be a functional component integrally built in said frame.

[0003] Certain care is needed in the installation of plug-in units in the frame of a telecommunications device because the galvanic contacts between the electric connectors of the plug-in unit and corresponding electric connectors of the frame may be poor, or even non-existent, if the plug-in unit is not properly seated in its place. In a prior-art solution, some pins in the electric connectors between the plug-in unit and the frame are shorter than other pins in said electric connectors. Those shorter pins are part of a test circuit for detecting whether the plug-in unit is installed in the plug-in unit slot in such a manner that said shorter pins make galvanic contacts in the electric connectors between said plug-in unit and said frame. If said shorter pins make the galvanic contacts it is practically certain that the longer pins in said electric connectors make adequate galvanic contacts in the electric connectors. The above-described prior-art arrangement for indicating correct installation of a plug-in unit is possible if the frame of the telecommunications device has got wirings belonging to the test circuit mentioned above. Often, however, there are no such wirings in the frame of a telecommunications device and the post-installation of such wirings would be expensive and difficult especially if said telecommunications device has been delivered to the telecommunications operator and is already in productive use.

SUMMARY

[0004] The invention is directed to a novel arrangement for indicating correct installation of a plug-in unit of a telecommunications device. An arrangement according to the invention comprises at least one distance indicator located in said plug-in unit and adapted to produce an indication for correct installation of said plug-in unit in response to a situation in which the distance of said distance indicator from a wall of the frame of said telecommunications device is smaller than a predetermined threshold value, where said distance indicator is capable of producing said indication without a need for a galvanically conducted electric current between said distance indicator and said frame of the telecommunications device.

[0005] Said predetermined threshold value is chosen such that when said distance indicator produces said indication, reliable galvanic contacts will have been formed in the electric connectors between said plug-in unit and said frame.

[0006] Said distance indicator may be e.g. an electromechanical limit switch adapted to produce said indication in response to a situation in which said plug-in unit is inserted so far towards the wall of the frame of the telecommunications device that reliable galvanic contacts will have been formed in the electric connectors between said plug-in unit and said frame. Said distance indicator may also comprise, for example, a capacitive distance sensor, magnetic distance sensor or a distance sensor based on a beam of light.

[0007] In an arrangement according to the invention there is no need to have electrical circuit arrangements in the frame of the telecommunications device for indicating correct installation of plug-in units. An arrangement according to the invention can thus also be used in conjunction with telecommunications devices in which there are no such electrical circuit arrangements in the frame.

[0008] The invention is also directed to a novel method for indicating correct installation of a plug-in unit of a telecommunications device. In a method according to the invention there is produced, using at least one distance indicator located in said plug-in unit, an indication for correct installation of said plug-in unit in response to a situation where the distance of said distance indicator from a wall of the frame of said telecommunications device is smaller than a predetermined threshold value, where said distance indicator is capable of producing said indication without a need for a galvanically conducted electric current between said distance indicator and said frame of the telecommunications device.

[0009] The invention is also directed to a novel plug-in unit for a telecommunications device. A plug-in unit according to the invention comprises at least one distance indicator adapted to produce an indication for correct installation of said plug-in unit in response to a situation where the distance of said distance indicator from a wall of the frame of said telecommunications device is smaller than a predetermined threshold value, where said distance indicator being capable of producing said indication without a need for a galvanically conducted electric current between said distance indicator and said frame of the telecommunications device.

[0010] The various embodiments of the invention are characterised by that which is specified in the dependent claims.

BRIEF DESCRIPTION OF DRAWINGS

[0011] Embodiments of the invention, presented by way of example, and their advantages will now be described in closer detail with reference to the accompanying Figures where:

[0012] FIG. **1***a* shows a telecommunications device comprising a frame with plug-in units installed therein and an arrangement according to an embodiment of the invention for indicating correct installation of the plug-in units,

[0013] FIGS. **1***b* and **1***c* show a plug-in unit of the telecommunications device depicted in FIG. **1***a* and a detail of the frame of said telecommunications device,

[0014] FIG. **2** shows a plug-in unit according to an embodiment of the invention and a detail of the frame of a telecommunications device,

[0015] FIG. **3** shows a plug-in unit according to an embodiment of the invention and a detail of the frame of a telecommunications device, and